New Pavement Design and Construction Methodologies

U.S. Department of Transportation
Federal Highway Administration
www.fhwa.dot.gov

Problem: Predicting pavement performance is essential to improving the design of new and rehabilitated pavements

The design of new and rehabilitated pavements during the past 50 years has relied on sound empirical procedures that have been improved incrementally over time. Those procedures, however, have limitations because of their empirical nature. To overcome these limitations, further improvements depend on a new generation of design tools that combine the knowledge and experience gained from empirical procedures with the real-time effects of traffic loadings, environmental factors, and engineering materials.

Putting It in Perspective

- More than $20 billion of Federal funds are spent annually for pavement improvements.
- Increased pavement durability and performance can lead to significantly reduced life-cycle costs.
- Long-life pavements that reduce traffic disruption, improve safety, and that are cost effective and maintained efficiently support the Federal Highway Administration's (FHWA) goal of enhancing mobility.

Solution: Improve pavement design

The new generation of mechanistic-empirical (M-E) design tools is based on a combination of mathematical modeling techniques and computer software and hardware that can process enormous quantities of data and perform related computations in a reasonable timeframe. Such tools, once regarded as complex and inaccessible, are now readily available in user-friendly formats.

Why is M-E pavement design important?

Several principal types of distress reduce pavement life: fatigue, rutting, and thermal cracking for asphalt pavements; and cracking and faulting for concrete pavements. These distress types are analyzed in the models incorporated in the M-E design approach, which leads to an overall assessment of pavement performance regarding ride. An M-E analysis allows an engineer to optimize design and materials to minimize these distresses.

Successful Applications: M-E design guide implementation will help improve performance of the Nation's highways

A variety of educational activities will be introduced during the next few years to help States implement the M-E design approach. These include State and regional workshops, training courses, technical assistance, and a dedicated Web site. In 2004 and 2005, workshops will be held in at least six locations throughout the Nation. These workshops will provide an overview of the implementation guide.

Please plan to attend one of these 2004 workshops scheduled to introduce the M/E Pavement Design Guide:

Month	Location
May	Biloxi, MS
June	Vancouver, WA
July	Chicago, IL
August	Mystic, CT
September	Kansas City, KS
October	Phoenix, AZ

Additional workshops will focus on the materials data that is required as input for the M-E design process. Concurrently, training courses developed through the National Highway Institute (NHI) will be offered as follows:

- NHI #131064—Introduction to Mechanistic Design (Available).
- NHI # to be determined—Mechanistic-Empirical Pavement Design Guide (In Development).
- NHI #132040—Geotechnical Aspects of Pavements (In Development).
- NHI #151018—Application of the Traffic Monitoring Guide (Available).

FHWA has organized the Design Guide Implementation Team (DGIT) to develop a timely and effective program for implementing the M-E pavement design process. The DGIT will provide technical assistance to the States as they implement and use the process. After State agencies have begun implementation, technical issues such as local calibration, new materials, and unique load configurations will arise, and the DGIT will arrange small working sessions to address these local issues.

Benefits

- Improved structural pavement design based on real-time traffic, environment, and materials.
- Improved pavement performance and reduced traffic disruption and life-cycle cost.
- Increased customer satisfaction resulting from long-life pavements and a "get in, get out, and stay out" philosophy.

Additional Resources

Contact the DGIT directly by e-mail at:

DesignGuide.ImplementationTeam@fhwa.dot.gov

A dedicated Web site is being developed.

For more information, contact:

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